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Is Connectivism actually a theory of learning, or something else?

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1. Introduction

The growing impact of technology in education has focused the attention on understanding how humans are creating and constructing knowledge in the digital age. According to Siemens (2004) "Learning is a process that occurs within nebulous environments of shifting core elements – not entirely under the control of the individual." (p.4). This idea has given rise to the concept of connectivism as a proposal for a new learning theory, where individuals gain knowledge in a networked learning environment through the ability to look for information and filter what it is important for them (Jones, 2015). Over time, learning theories have emerged and evolved according to changes within society (Bates, 2015, p, 5). This paper explores whether connectivism has all the appropriate elements to be a new emergent learning theory that can be applied in all educational contexts.

2. Connectivism

2.1 Overview

The way people learn and communicate with others has been affected by the use of technology; since the creation of the internet it has been noticeable that people have had more access to information, while social interactions are no longer limited to physical spaces. Hence, it is important for educators to pay attention to how people are learning in the new digital era, in order to create effective learning environments (Jones, 2015, p.3). According to Prensky (2001), "our students have changed radically; today's students are no longer the people our educational system was designed to teach" (p.1). This is an important fact that connectivism is trying to address by situating the students at the centre of the learning process, whereas in contrast with times in the past learners can build their own knowledge through connections that they may make within a network (Garcia et al., 2013).

According to Siemens (2004) "Learning (defined as actionable knowledge) can reside outside of ourselves (within an organisation or a database)" (p.4). The idea of people learning from others, such as from a community of practice or a website, has been highlighted. Also, Siemens expressed that the ability to make new connections between information sets (nodes) is vital, in order to maintain the expansion of the information landscape of the learners (Jones, 2015). Hence, under this perspective the generation of knowledge comes from the integration of nodes, while the

learning is the network. There are valid aspects of the learning process that connectivism has been attempting to address, however, it is difficult to observe within this perspective how the learning progress is tracked or how it is possible to measure the expected learning outcomes within formal education (Whitworth, 2015). Indeed, there are those who question connectivism as a learning theory. Clarà and Barberà (2013, p.201) identified the absence of a consistent solution for the learning paradox, based on the fact that when learners do not know something, then it is impossible for them to recognises it in the process of exposure. Nevertheless, connectivism has both strong and weak points in relation to the learning process that are worth exploring, in order to understand how information is administered by the new generation of learners (Kathleen, 2011, p,675), especially within the different educational contexts around the world.

2.2 Connective knowledge and learning

The principle of connectivism is based on the idea that learning begins with a connection; these connections are present on neural, conceptual and social levels (Siemens, 2004). Moreover, the ability to keep a continual expansion of knowledge is vital (Tschofen, & Mackness, 2012). Thus, it is important to notice that due to this principle learners need to have the necessary skills to be able to select the relevant information for their information landscape. Kathleen (2011, p.683) explored connectivism as a complement to the information literacy that educators require, which creates an effective instruction for learners, even though it is not clear how humans transform all this information they receive into knowledge. According to Downes (2012, p.16), "knowledge is literally the set of connections between neurons in the brain (or between bits in a computer, or between people in a society, or between crickets in a forest". This affirmation leads to the belief that it is important to understand the concepts of things, in order to connect them and create meanings. For instance, Ecuador and Quito are just two words, but it is known that Quito is the capital of Ecuador because people possess the concept of a country and a capital city, thus it is possible to connect them in order to make sense of these two words. However, according to Siemens (2004, p.6), "the pipe is more important than the content within the pipe; our ability to learn what we need for tomorrow is more important than what we know today". Clara and Barberà (2013, p,202) criticised the lack of explanation on how learners are capable of accessing knowledge from outside the brain and creating new connections without a concept development.
In the learning theory of constructivism the social aspect of human interaction forms part of the acquisition of knowledge (Bates, 2015, p,46). Connectivism explains this aspect in the digital age as 'connective learning', where people learn and share knowledge through the use of social

networking, such as Web 2.0 tools and MOOCs (Downes, 2006). People learn from others in environments that are meaningful and can provide some type of identity (Wenger et al., 2002); and thus the interaction with other people can provide great benefits to the learning process. However, it has been questioned whether these social interactions can provide appropriate and relevant information for the learners (Hildreth, & Kimble, 2004, p.43). Downes (2012, p.372) identified four major elements of the connectivism learning dynamic in a community; autonomy, diversity, interactivity and connectedness. To an extent, these elements help the learners to evaluate the effectiveness of learning in a specific community, which eventually will lead to the creation of new knowledge. As a result, it is interesting to observe that within the idea of connectivism the students are highly independent, which allows them to have control of their own learning; although, it is not clear which is the process that the students need to follow to gain independence. Gerstein, (2014,p.92) linked connectivism to a heutagogical learning and teaching approach, where learners are self-determined and teachers are viewed as facilitators of resources and guidance.

Nevertheless, it is important to understand that young learners might need more guidance and course scaffolding. Blaschke (2012) identified this process as the "progression from pedagogy to andragogy then to heutagogy" (p.60), where the instructors initially control and provide the information, and subsequently direct this progress gradually to a point where learners become independent and understand their process of learning. Even though connectivism integrates social learning and constructivist theories of education, it does not have a clear framework to explain how learners can scale in the learning process according to the physical maturation or changes in their social interactions or life events (Kop & Hill, 2008). Consequently, there is an important factor in regards to learning that connectivism has failed to acknowledge, which leads to criticism of its validity as a learning theory.

2.3 Massive Open Online Courses (MOOCs)

As a part of the proposal for "connective learning and knowledge', Massive Open Online Courses (MOOCs) were created, where the idea was to provide access to people from around the world to voluntarily enrol and connect to open free courses that were normally offered by prestigious universities (Downes, 2006). The concept of connecting people with the provision of free learning courses in various areas is a big step within education. Nevertheless, it is difficult to see how this type of learning would be applicable in developing countries where for example governments and

people remain in the stages of merely ascertaining appropriate resources to generate electricity or sanitary water. Liyanagunawardena et al. (2014, p.39) identified the lack of internet connectivity, and part time electricity in rural areas and small towns of developing countries as one of the issues to the implementation of MOOCs. However, there are still possibilities for the big cities, due to the fact that governments generally provide more economical support to them, although it is important to note that most of these courses are only administered in English, which restricts the access for a large amount of people. As a consequence,, it is challenging to refer to "connective learning" when there are economical and language barriers within this model.

In addition, McGreal et al. (2013,p.9) acknowledged how difficult is to sustain the development, delivery, and updates of MOOCs, as they require the economic resources from the providers to maintain the continuation of this model. Nevertheless, universities aim to engage people through MOOCS, in order to attract new fee paying students, whilst simultaneously gaining a global position and recognition in educational innovation (Whitworth, 2015). Hence, it appears that these types of courses are just reserved for universities that have the resources and the staff to create and maintain MOOCs, which leads to understanding whether this is real "connective learning", or whether it is just a business strategy of the big universities to attract more students. Daniel et al. (2015, p.66) referred to MOOCs as a "freemium" to "premium" business model, where courses are offered free at the first stage without any type of fee payment, yet without any accreditation, which can be termed as a "product trial period"; subsequently, if people are happy with the course, then they may upgrade to a "premium" and pay to gain an accreditation. Therefore, it needs to be analysed whether the idea of connectivism as a learning theory has been proposed for specific learning contexts, where factors such as good technological infrastructure, economic resources, and English language skills are important factors.

3. Connectivism as a learning theory

3.1 Connectivism and the traditional learning theories

Connectivism as an emergent learning theory does not provide an adequate response to the students' paradox, nor does it have a clear framework that allows adequate concept development for the learners. Also, "connective learning and knowledge" in the form of MOOCs leaves much to be criticised in relation to its accessibility and applicability in different educational contexts. Hence, the forms of developing connectivism into a new learning theory need to be comprehended. Guder (2010) mentioned that learning theories could be divided into two main groups: 1) direct instruction and (2) student-centred learning, which both help educators

understand how students learn. According to that definition, it is possible to identify the behaviourism, cognitivism and constructivism among the most remarkable learning theories, which have emerged through times. Initially; in the theory of behaviourism, Pavlov proposed conditioning with a stimulus response as an instrument to enforce the learning process, where the teacher is the only individual that controls the access to information (Bates, 2015,p 30). After a few years, Dewey identified the need to pay attention to the cognition and mental capabilities of people in addition to their behaviour, before Vygotsky established a constructivism theory where individuals learn through social interactions in their environment (Jones, 2015).

It is possible to appreciate that in all of these traditional theories the teaching practices and learning process generally revolve around the learner behaviour, learner cognition and metacognition and learner social interaction. Kop and Hill (2008) suggested that there is no need to identify connectivism as a separate learning theory, as the traditional theories can still be integrated within the new technological era; the authors proposed connectivism as a new emergent pedagogy, where the development of independent learners is key. Similarly, Conradie (2014) proposed connectivism as a valuable framework for developing learning in communities of practice and promoting independent learners. Consequently, it is possible to identify that in whichever scenario of connectivism as a learning theory or pedagogical approach, learners will have to gain the adequate skills to self-regulate their learning and also be able to filter and select the relevant information for them.

3.2 Teaching in a connected environment

Connectivism has been discussed from the learners' points of view, but the teachers' roles within this concept also need to be clarified. Siemens (2008) identified the rapid growth in internet usage, proliferation of mobile applications, Web 2.0, and the increase of connectedness between people as factors that will have implications in teaching practices. Thus, teachers and educators have to become aware that the learners are gaining autonomy with the help of technology. According to Kop and Hill (2008), "the role of the tutor will not only change, but may disappear altogether" (p.9); learners are gaining the power to access and select their own information. However, it is difficult to contemplate this occurring in the near future, even if technology advances to a point where robots take the roles of human beings, as teachers and educators will still be required in order to provide adequate guidance.

Therefore, it is important that teachers possess the adequate knowledge and skills to be able to teach and guide learners who are becoming more independent. Mishra and Koehler (2006) proposed a teaching framework which includes: technological knowledge; ability to access and use the correct technological tools; pedagogical knowledge; the correct application of teaching methodologies and content knowledge; the knowledge regarding a specific subject (TPCK), which will all provide the adequate integration of technology for a specific content. Nonetheless, this framework has been criticised due to the fact that it remains purely teacher-centred, while within this framework the learner and the context factors are not present (Harris, & Hofer, 2011). As a consequence, it is important to note that within the concept of connectivism the teachers need to adapt and direct their practices to provide the learners with engaging learning environments, which allow them to maintain a balance of the information they receive from the networks and the formal educational settings.

4. Conclusions

The current paper has explored the statements and the critics around connectivism as a learning theory; it has been possible to observe that there are various aspects of the learning process that this hypothesis of learning has not been able to address, such as the learning paradox and the explanation of the development of concepts. Likewise, the "connective learning and knowledge' concept in the form of a Massive Open Online Course (MOOC) has economic and technological barriers, which restricts its application in several educational contexts. However, whether connectivism is an emergent learning theory or not, this is not the important factor, as none of the learning theories can provide a full explanation of how humans learn. What matters is that technology provides learners with open and continuous access to information and knowledge, which means that there is a need for the learners to acquire the necessary skills that would allow them to select the adequate information and not overload themselves. Hence, it is possible to propose connectivism as a pedagogical approach that teachers can utilise to provide the learners with information literacy skills. Additionally, connectivism could provide a good framework for teachers to adequately integrate social networking into formal education.

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